ServiceInsights

FOR INDEPENDENT SERVICE CENTERS

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JUL–SEP 2013

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2014 IMPALA

New from the Ground Up with Never Before Available Advanced Technologies

More Inside: Impala Service Procedures

Access to GM vehicle collision repair information is free. Go to www.genuinegmparts.com for details.

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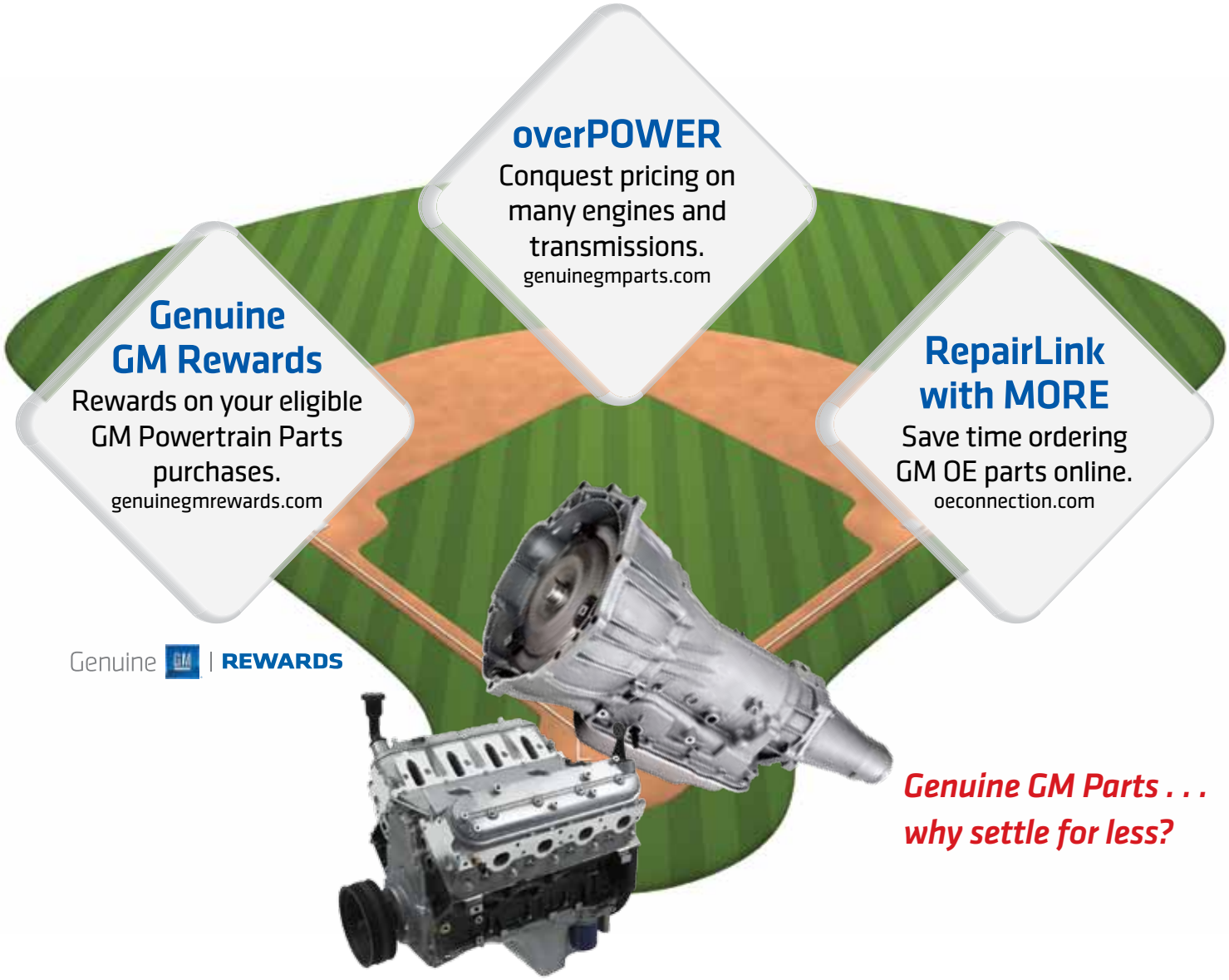
GM Parts Powertrain Triple Play

Designed around you.



Genuine GM Parts . . . why settle for less?

GenuineGMParts.com

Genuine GM | Parts

A *Tough* Part for a *Tough* Job

Genuine GM Parts Torque Converters with EC^3 are the Smart Choice

GM EC^3 Torque Convertor

- Electronically Controlled Capacity Clutch material, patented by GM, expands the operating window of the converter clutch by controlling the clutch
- Maintains proper heat range to prevent overheating
- Improves long-term durability and fuel economy

Torque converters used in GM vehicles are an especially high-tech breed built for the rigors of a demanding job.

What sets them apart is GM's Electronically Controlled Capacity Clutch. EC^3, for short, incorporates special friction material that allows the converter clutch to continuously slip at low speeds. That delivers smoother shifting at a wider range of speeds, better fuel economy and less wear and tear.

Just as EC^3 is a smart technology, the intelligent choice for changing out a torque converter in a GM application is a Genuine GM Parts replacement assembly that uses EC^3.

Competing products simply don't stack up. Typically, the friction materials they use – notably Kevlar® - generate excessive heat and don't deliver the same smooth slip produced with the GM EC^3 torque converter.

"That material is durable, but the heat it generates degrades transmissions and it grabs when it engages, leading to noise/vibration/harshness issues," says Chris Thomas, GM Customer Care & Aftersales (GM CCA) product development manager for transmissions.

While there's a big gap in performance, the issue of heat buildup is critical from a durability and longevity standpoint. In addition to using materials that produce more heat, aftermarket torque converters can trap heat. That's because unlike the Genuine GM Parts product, most come painted, Thomas says. That paint, while it may produce an attractive torque converter, can act as a barrier to heat dissipation.

For nearly all GM applications beginning with model year 1999, factory-installed torque converters employ EC^3. When they fail, replacing them with anything but the GM OE product is an invitation to trouble and unhappy customers. A non-EC^3 torque converter will struggle to operate efficiently in a system designed for the technology. The end result is that drivers could very well detect a changed driving experience.

"Aftermarket products are often one-size fits all, whereas GM torque converters are calibrated for the vehicle," Thomas says. "For instance, they might not account for differences in stall speeds, and that might lead to vehicles with after-market torque converters experiencing rollbacks on hills."

continued on page 5

The Technical Side

continued from page 4

A Genuine GM Parts torque converter, the one designed for the application, is readily available through GM dealers. And now, with new pricing on torque converters, there's even more reason to choose the OE product.

Priced to be more competitive with aftermarket products, the Genuine GM Parts product will be the choice of more Independent Service Centers (ISCs). The end result: they and their customers will have the torque converter that unquestionably delivers the performance and durability demanded of this essential vehicle component.

All-New 2014 Impala

The 2014 Impala is new from the ground up and represents the 10th generation of one of the industry's most enduring and popular nameplates.

Three Powertrain Options, All with Six-Speeds

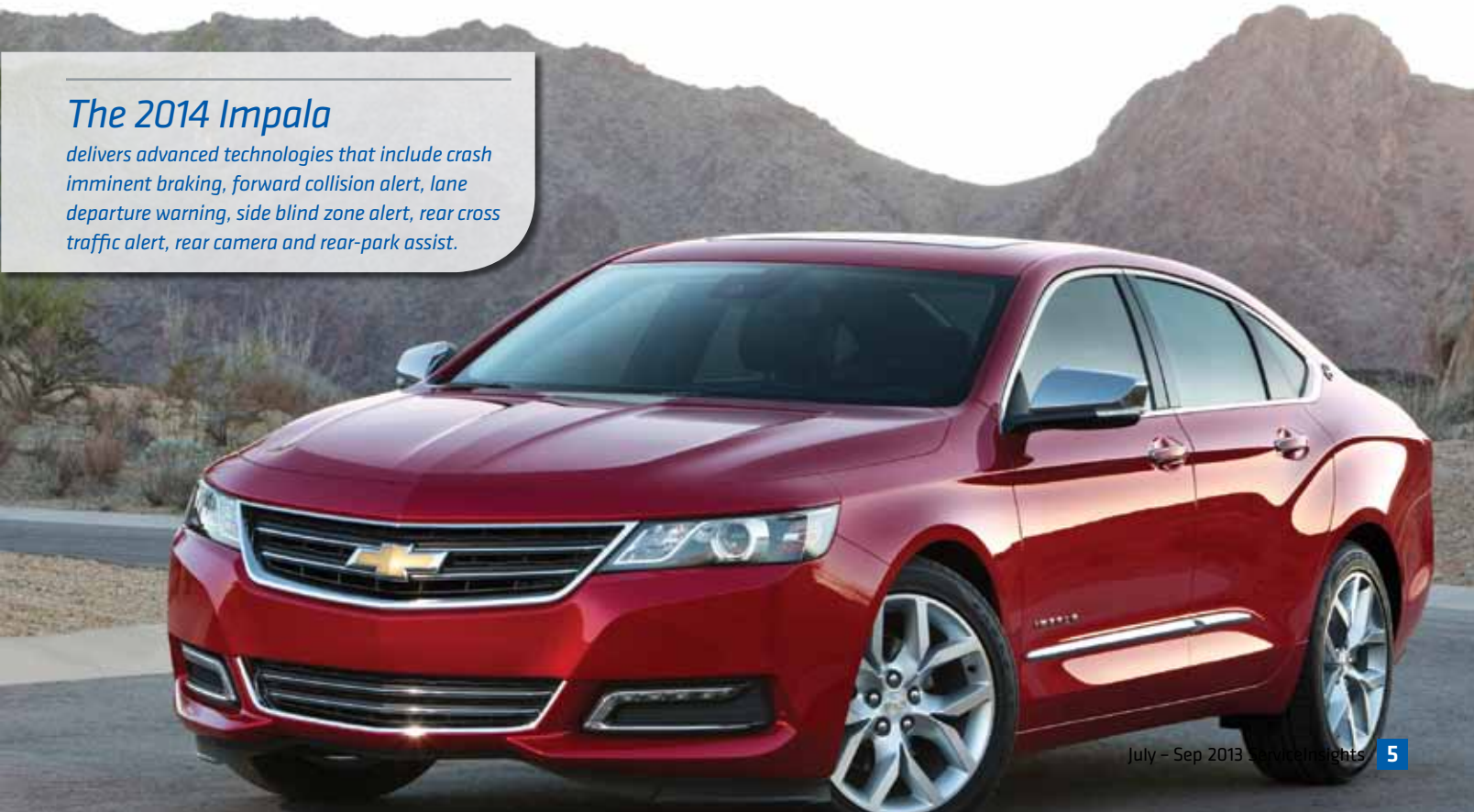
The three powertrain options each feature fuel-saving direct injection and lightweight components. They include the 3.6L V-6, the new Ecotec 2.5L four-cylinder and the Ecotec 2.4L with *eAssist.*

Powertrain Highlights:

- Output for the 3.6L V-6 is rated at 305 horsepower (227 kW) and 264 lb.-ft. of torque (358 Nm). That is the highest horsepower output in the segment from a naturally-aspirated V-6 engine.
- The Ecotec 2.5L is part of a new family of four-cylinder engines developed with increased efficiency and greater refinement. It is rated at 196 horsepower (145 kW) and 186 lb.-ft. (253 Nm) of torque

The 2014 Impala

delivers advanced technologies that include crash imminent braking, forward collision alert, lane departure warning, side blind zone alert, rear cross traffic alert, rear camera and rear-park assist.



The Technical Side (cont'd.)

- Impala's Ecotec 2.4L engine with *eAssist* provides electrical assist in certain conditions to help save fuel. It is rated at 182 horsepower (134 kW) and helps achieve estimated highway mileage of 35 mpg. The 2.4L with *eAssist* will be available at the end of this year
- All of Impala's engines are matched with six-speed automatic transmissions.

The Ecotec 2.5L I-4 engine for the 2014 Impala features Intake Valve Lift Control technology (iVLC). iVLC allows the valves to open and close by varied amounts and at different times depending on power demand to provide greater fuel efficiency or power.

Stronger, Quieter Body

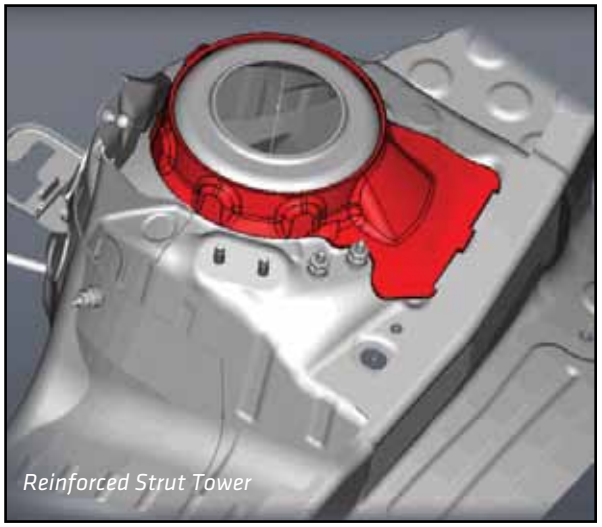
The 2014 Impala's comfort and refinement are rooted in a stronger body structure, enabling a quieter passenger environment and a greater overall feeling of quality. The stiffer architecture also enabled engineers to tune the ride and handling more precisely, for a greater feeling of control and comfort.

With active noise cancelation (4-cylinder models), ceiling-mounted microphones detect engine noise, the frequencies of which are processed by a computer that directs counteracting sound waves through the audio system's speakers and subwoofer. This technology helps eliminate noise levels associated with torque converter lockup at low speeds.

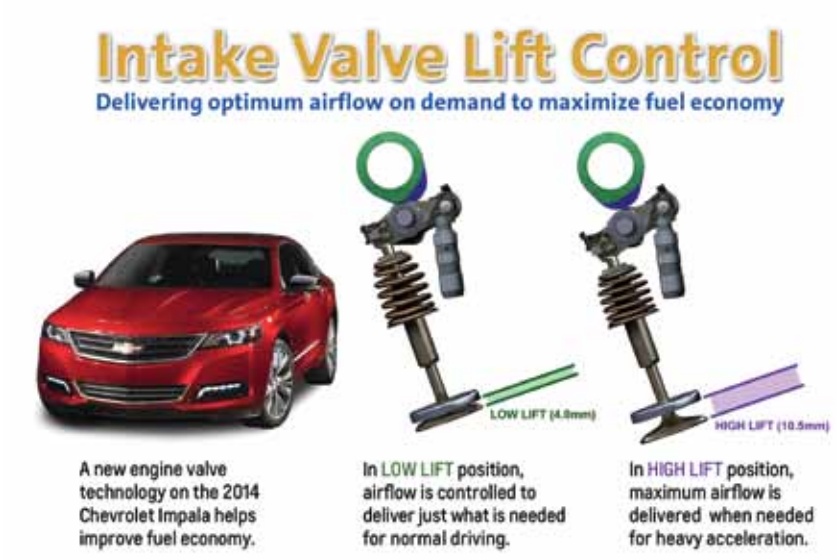
Engineers optimized the upper body structure shape, material, and metal gage to meet all performance requirements with minimal mass, and then applied the mass strategically to other areas of the vehicle. This mass savings allowed engineers to add a front strut tower reinforcement to improve structural feel.

Those strut towers are home to a MacPherson-strut front suspension design that delivers a greater measure of control with rebound springs that are internal to the struts.

An isolated front cradle for the engine and transmission, as well as a hydraulic ride bushing, help deliver a smoother, quieter ride. At the rear is a proven four-link suspension design, with a slightly wider track that contributes to the Impala's more planted feel on the road. Isolated mounting provisions for the rear suspension also contribute to the car's quiet, smooth driving experience.



Reinforced Strut Tower


Intake Valve Lift Control
Delivering optimum airflow on demand to maximize fuel economy
LOW LIFT (4.0mm)
HIGH LIFT (10.5mm)
A new engine valve technology on the 2014 Chevrolet Impala helps improve fuel economy.
In LOW LIFT position, airflow is controlled to deliver just what is needed for normal driving.
In HIGH LIFT position, maximum airflow is delivered when needed for heavy acceleration.

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The Reasons for Wheel Alignment

With freezing winter weather and a wet spring in many parts of the country that played havoc on road conditions, many customers may be concerned about the wheel alignment of their vehicle.

Before performing a steering wheel angle/front toe set or wheel alignment check or adjustment, be sure there is nothing about the vehicle's condition or equipment that could contribute to a misalignment condition. Things to consider include:

Wheels and Tires – Verify that wheels and tires are original equipment or the correct size for the vehicle application. Slight feathering on the shoulders of tires is not considered unusual tire wear.

Suspension – Verify that the vehicle suspension has not been altered, including the addition of an aftermarket suspension lift or lowering kit. Measure ride height to help identify any worn components.

Vehicle Damage – Check for evidence of accidental damage that could affect alignment. Look for subtle items like scuffed wheels or tire sidewalls, which may indicate curb damage that can affect alignment.

Added Equipment – Check for equipment that may significantly affect vehicle mass, such as large tool boxes, snow plows, and campers. Significant additional mass can affect the trim height and wheel alignment of the vehicle. Upfitters are instructed to realign the vehicle after installation of these types of items.

It is important to gather as much information as possible to understand the customer concern, and to record complete before and after alignment measurements on the vehicle.

Drive the vehicle to verify that the vehicle does have a pull condition and not a steering wheel angle issue. A vehicle with a valid pull condition will pull to one side or the other, regardless of steering wheel angle, when at a constant highway speed on a typical straight road.

Always note which direction the steering wheel is clocked (left/counterclockwise or right/clockwise). When dealing with a verified steering wheel angle condition, remember that front and rear toe are the only alignment values that affect the angle of the steering wheel.

Causes of Vehicle Pull

A vehicle pull condition may be caused by several factors.

Tires – If a pull condition has been verified but the alignment settings all are within specifications, the issue may be in the tires. Certain tire differences left to right may cause a vehicle pull. Temporarily swapping the front tires left to right and re-evaluating is a simple way to verify a tire issue. Always note if tires are directional and not able to be permanently swapped side-to-side.

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The Job of Magnetic Drain Plugs

Magnetic drain plugs in drive axles, transmissions and transfer cases are designed to attract metallic particles generated during normal operation and prevent them from passing through the gears or bearings.

During service repairs and maintenance, inspect the drain plug for large metal deposits. Small metal flakes and fine metal dust on the plug magnet are considered normal.

Normal amount of debris on a drain plug.

Large metal deposits or particles on the plug magnet, such as gear teeth, bearing fragments and large metal shavings, are not a normal condition. If these conditions are found, repairs may be needed to prevent further component damage.

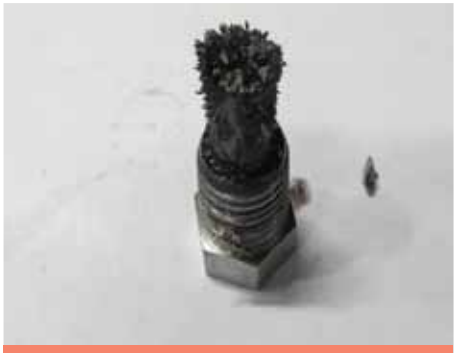
An abnormal amount of debris with large metal shavings on a drain plug.

What to Look For

When inspecting metallic particles on a plug magnet, it's important to determine the size and source.

Fine Metal Particles — Fine metal particles are normal and are the result of internal component wear, which can shed fine metallic particles at a steady rate.

Metal Shavings — Metal shavings, which are often remnants from the housing machining process, may adhere to the plug magnet. These shavings are not detrimental



Fine metal particles

to component operation and do not require component replacement.

Bearing and Gear Teeth Fragments — Fragments from bearings and gear teeth indicate component damage that is not considered normal. Components should be inspected for damage and repaired as needed.

Fluid Conditions

The color of the fluid can be an indicator of contamination; however, some colors can be easily confused with the normal color of some fluids.

New fluid is usually red or light brown. With time and miles, used fluid often turns black. This is a result of the normal chemical process that occurs as the additive package in the fluid degrades. The black color does not indicate that the fluid's useful life has been exhausted.

When a fluid is a milky brown color, it may indicate that the fluid is contaminated with significant moisture. The fluid should be changed.

Water contamination of the axle lube also creates significant odor and forms corrosive conditions that will cause internal components of the axle to corrode. Milky-colored fluid combined with rust particles is a sign of moisture contamination either from submersing the axle vent, a pinched or misrouted vent hose, or a failed seal that is allowing moisture to enter the axle.

Under 5000 miles (8,000 km) of operation, hypoid axle lube may appear tinted and have a whitish or yellow appearance from the gear marking compound used in the production of the axle.

– Thanks to Dave Peacy and David MacGillis

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ACDelco TechConnect is published bi-monthly and online for Independent Service Centers and Key Fleet accounts to provide timely service information, increase knowledge and improve the performance of the service center.

ACDelco 360 represents our mission to look at our businesses at every possible angle to provide value and assistance to our distributors and their customers as well as offer a full circle of support with programs, tools, training and marketing focused on enhancing and growing our partnership successfully.

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ACDelco service tips are intended for use by professional technicians, not a "do-it-yourselfer." They are written to inform those technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions and know-how to do a job properly and safely. If a condition is described, it cannot be assumed that the information applies to all vehicles or that all vehicles will have that condition.

All materials and programs described in this magazine are subject to change. Submission of materials implies the right to edit and publish. Inclusion in the publication is not necessarily an endorsement of the individual or the company.

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The Reasons for Wheel Alignment –

continued from page 1

Plus, always ensure tire pressures are set to correct specifications before and after evaluating a vehicle.

Alignment Settings – Front or rear toe values being out of specifications do not cause an otherwise true vehicle pull. If only front or rear toe values are out of specification on a vehicle with a confirmed pull issue, something else is causing the pull.

Steering Calibrations – Electronic Power Steering (EPS) steering position and torque sensors that are not calibrated correctly may cause a lead or pull condition.

Prior to any measurement on an alignment machine, confirm the current specifications and tolerances in the appropriate Service Information. Do not assume the numbers in the alignment machine are correct and up-to-date. The vast variation in specifications, depending on the type of vehicle and tire, suspension and engine options, makes it easy to use the wrong wheel alignment specs.

It is possible for customers to confuse a steering wheel off angle

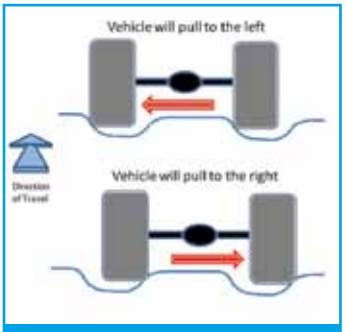
Verify lead/pull conditions

condition as a vehicle pull condition, as they may be trying to hold the wheel centered (level) on a straight road, which would be adding a slight steering input to the wheels.

Road Conditions

Road Slope – High road slope angles can cause a vehicle to drift one way or the other. Use a road that is as flat as possible for evaluations.

Trough Wander/Tramlining – Troughs or grooves in the road can pull a vehicle to one side or the other, depending on where the tire is located in the groove. The tires will always want to pull the vehicle up the wall of the trough. Vehicles with low aspect ratio, wide tires tend to be more sensitive to this condition. Adjusting alignment settings will not improve a trough wander condition or the sensitivity of the vehicle to trough wander.



Effect of trough wander

To review all of GM's standard wheel alignment service procedures, refer to Bulletin #05-03-07-009.

For an overview of wheel alignment procedures, check out the online ACDelco Wheel Alignment training course, S-SS04-05.01WBT.

– Thanks to Rick Balabon

New Chevy HHR Interior Door Handle Kit

Instead of either replacing an entire door trim panel on a Chevrolet HHR that comes with the door handle pocket assembly, or replacing just the assembly, GM offers a new HHR Door Handle Kit that makes it possible to replace only the door handle, an economical alternative to the previous handle replacement strategy.

Door handle kit

The interior door handle replacement kit installs quickly and is less likely to compromise trim panel integrity and cosmetics than the alternative repair methods. The kit is available for right-hand doors (part number 19299613) and left-hand doors (part number 19299614).

Other aftermarket products may call for replacing the modular designed door handle pocket with a new one, which involves drilling away the melted area of five plastic stakes that attach the handle pocket to the trim panel assembly, removing the entire pocket, and attaching the new assembly by gluing metal trim screws into the heat-staked plastic areas. The pocket assembly on the HHR door is not designed for removal and the addition of trim screws in the heat-staked plastic studs may leave marks on the trim panel's exterior surface.

The interior door handle replacement kit involves a simple three part

Interior trim panel

kit: a door handle, pin and spring. After removing the interior trim panel, pull the pin to remove the damaged handle. The new handle, pin and spring are installed into the modular door handle pocket.

This quick and easy repair makes the new HHR inside door handle kit more economical than replacing the entire door panel.

– Thanks to Rick Balabon

Absorbent Glass Mat Batteries

Up until the Absorbent Glass Mat (AGM) battery was introduced, automotive starting batteries always contained lead plates submerged in liquid electrolyte. The AGM battery eliminates the need to immerse the plates. The result is a battery that is lighter (a critical aspect with today's increasing focus on fuel economy) for the amount of power it can produce. It's also more durable in many applications and has extended life when compared to a traditional flooded-cell battery.

Currently, an AGM battery is standard equipment in the Chevrolet Volt and Cadillac ATS. ACDelco offers an AGM battery for many applications as well as a special EREV (Extended Range Electric Vehicle) AGM battery for the Volt.

The AGM battery may be used in place of a conventional battery. Just be sure to match the Cold Cranking Amp (CCA) and Reserve Capacity ratings.

Inside the Battery

The AGM battery has a lifetime supply of electrolyte in its absorbent glass mat fiberglass separators that are held in contact with the lead plates. The chemical reaction that takes place between the sulfuric acid in the electrolyte and the lead oxide in the lead plates create the electrical flow. The sealed AGM battery also uses gas recombinant technology that causes the hydrogen and oxygen byproducts — two natural byproducts that are produced when water in the electrolyte decomposes during charging — to convert directly back into water so the absorbed electrolyte replenishes itself.

The battery does not have any vent plugs. It may have up to six vent relief valves that allow the small amount of gas that is produced when charging to escape.

Testing and Charging

Testing and charging the AGM battery is different from regular lead acid batteries.

When using any battery charger, check that it is set up properly to charge an AGM battery, including selecting the proper battery type, AGM setting, and CCA during charger set up. Selecting the wrong type of battery and CCA could cause misdiagnosis and/or overcharging of the battery, which could lead to inadvertent battery replacement or battery damage.

The time required to charge a battery will depend upon the battery charger capacity, the state of charge of the battery (a discharged battery with a voltage below 11 volts will have a very high internal resistance and may only accept a very low current at first), the temperature of the battery and battery capacity.

Use a taper-rate charger that reduces the charging rate as the battery approaches full charge, then stops the charge or switches to a float charge status when full charge is reached.

In addition, when load testing an AGM battery make sure to connect the tester directly to the battery and not to the remote connection under the hood.

When charging, it is recommended to connect the charger directly to the battery if the battery is accessible. If the battery is not accessible, such as a dead battery and the cargo area cannot be opened, it is OK to charge or jump-start the vehicle from the remote access area under the hood as long as 40 amps is not exceeded by the charging device.

– Thanks to John Munsell

ASE Test Prep Study Guides Available

ASE test prep study guides are available through the ACDelco Learning Management System (LMS) on www.acdelcotraining.com. The study guides cover the Automotive Tests (A1-A8), the Service Consultant Test (C1), Compressed Natural Gas Vehicle Test (F1) and Exhaust Systems Test (X1).

To access the study guides, perform a catalog search on the ACDelco LMS. Select Course Name contains "ASE" and the Course Delivery Type of Self Study.

To register for ASE tests, go online to www.myASE.com or call the ASE testing partner, Prometric, at 1-977-346-9327.

—Thanks to Greg St. Aubin

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Tips for Successful Brake Service

The keys to a successful brake service involve making the right call on rotor refinishing, cleaning all components and proper assembly. The result: a brake service that leaves the rotors with plenty of life and without unacceptable noise.

Brake Noise

Some brake noise is normal and differences in loading and driving style can affect brake wear. Inspect all metal-to-metal contact areas between pads, pad guides, calipers and knuckles, which should be clean and lubricated with a thin layer of high temperature silicone grease (use ACDelco Silicone Brake Lubricant, part number 88862182).

The lubricant, when applied to the back of each pad, acts as a brake dampening compound that allows parts to slide freely and not vibrate when moving relative to each other.

ACDelco Silicone Brake Lubricant

The following noises may be normal characteristics of a braking system and do not indicate improper operation.

- Squeak/squeal noise – Occurs with front semi-metallic brake pads at medium speeds when light to medium pressure is applied to the brake pedal.
- Grinding noise – Common to rear brakes and some front disc brakes during initial stops after the vehicle has been parked overnight. This is caused by corrosion on the metal surfaces during vehicle non-use.
- Groan noise – May be heard when stopping quickly or moving forward slowly from a complete stop. During hard braking applications, this noise is a normal function of the anti-lock brake system activation.

Rotor Refinishing

Before refinishing brake rotors, refer to the Minimum Thickness specification in the appropriate Service Information. Verify that the specification stamped on the rotor is the minimum thickness specification after refinish and not the discard specification.

Replace the rotors if they do not meet the minimum thickness specification. Do not refinish new rotors.

If refinishing is required, verify the lathe equipment is properly calibrated.

After completing the refinishing, create a non-directional finish on the rotor by sanding both sides of the rotor using a sanding block and 130-150 grit sandpaper for about one minute per side.

Cleaning Brake Rotors after Refinishing

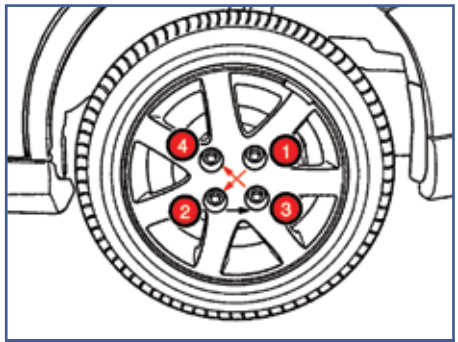
GM now recommends washing brake rotors with soap and water after refinishing. It has been determined that soap and water, such as a mild dish washing soap, is more effective in cleaning rotors than using denatured alcohol or approved brake cleaner.

If the brake rotors are not thoroughly cleaned after refinishing, brake squeal or other noises may occur due to residual steel particles — finite metal dust left as a by-product of the refinishing process — being present on the brake rotor.

Before reassembly, clean all brake corner mating surfaces, including the hub, rotor and wheel.

Wheel Torque

Inappropriate wheel torque methods may cause the wheel and tire assembly to be offset when mounting, which creates vibration similar to a tire with high Radial Force Variation or a tire with an imbalance. Improper torque also may cause brake rotor distortion and result in wheel mounting variance, causing smooth road shake vibration.



Index the tire and wheel assembly, use an appropriate torque pattern, and torque the lug nuts to spec using a torque wrench.

For proper wheel installation, index the tire and wheel assembly at least two stud positions from the previous position. Tighten the wheel lug nuts using an appropriate torque pattern. With all lug nuts snug, lower the vehicle until there is enough contact to provide resistance and complete the torque to specification using a torque wrench.

Do not use torque sticks or an impact driver to tighten the wheel lug nuts.

Brake Pad and Rotor Burnishing

Burnishing the brake pads and rotors helps to ensure that the braking surfaces are properly prepared after service has been performed. The burnishing procedure should be performed whenever the brake rotors have been refinished or replaced, and/or whenever the brake pads have been replaced.

1. Select a smooth road with little or no traffic.
2. Accelerate the vehicle to 30 mph.
3. Using moderate to firm pressure, apply the brakes to bring the vehicle to a stop. Do not allow the brakes to lock.
4. Repeat these steps for approximately 20 stops. Allow sufficient cooling periods between stops in order to properly burnish the brake pads and rotors.

– Thanks to Rick Balabon

ACDelco Diagnostic Hotline Offers New Flat Fee Option

Have a tough or unusual service repair on any make or model, foreign or domestic, including medium-duty trucks? Call the ACDelco Diagnostic Hotline for help.

With their new Flat Fee Unlimited Call option, technicians can call regarding a repair on one vehicle as many times as needed. Plus, the ACDelco Diagnostic Hotline still offers the economical per minute call rate.

Unlimited Calls for $35

Just introduced, the Flat Fee Unlimited Call option is available for $35 per case. After the first call, all additional calls on the vehicle are free until the case is closed.

In addition to the flat fee option, ACDelco Professional Service Centers (PSC) still can choose to receive the discounted call rate of $2.85 per minute (the first 10 minutes for any new PSC account are free).

Making the call to the ACDelco Diagnostic Hotline is easy and hassle-free. There is no charge for preliminary information. The clock starts when you start troubleshooting with the technical expert. For particularly difficult issues, you can request schematics via fax or email.

The experts at the ACDelco Diagnostic Hotline can offer live assistance on any service issue. These experts:

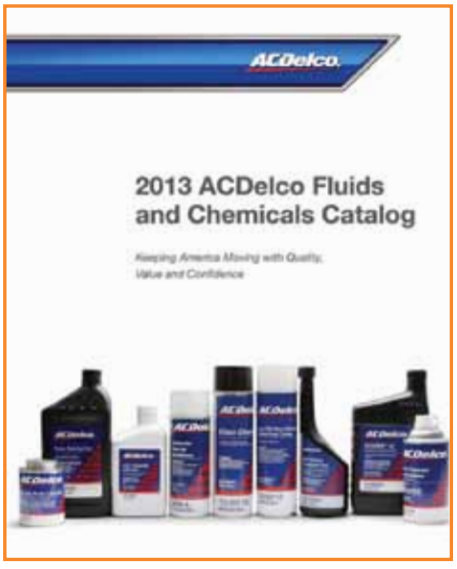
- Are specialists by make (all makes and models)
- Have an average of 25 years service experience
- Are continually updated with the latest training on new systems and components
- Have the latest factory information available, including direct access GM OEM Service Information

Additionally, if you desire to re-bill your customer, you may request an invoice for the cost of the call, including a mark up if desired, to attach to your customer's statement.

The ACDelco Diagnostic Hotline can be reached at 1-800-825-5886, prompt #2. Provide your ACDelco Professional Service Center six digit account number when calling.

– Thanks to Jill Brown

2013 ACDelco Fluids and Chemicals Catalog Now Available



ACDelco has recently released the new 2013 ACDelco Fluids and Chemicals Catalog, item number VC-CA-0304-12A.

The new catalog includes a Service Event Quick Reference Guide that highlights common automotive service events — such as engine service, brake service, drive line service — and the associated ACDelco fluid and chemical products. It also features a section on GM Recommended Fluids at GM Recommended Intervals, which provides information about the uses of a variety of ACDelco fluids and lubricants.

The catalog covers a variety of fluids and chemicals, including:

- Adhesives
- Air Conditioning
- Antifreeze/Coolants
- Appearance
- Axle Lubes/Fluids
- Body Shop
- Brake Cleaners and Fluids
- Carb/Choke Cleaner
- Diesel Exhaust Fluid
- Fuel System
- Lubricants/Greases
- Motor Oils
- Paints
- Power Steering Fluids
- Sealants
- Transmission Fluids

Additional hard copies of the catalog (VC-CA-0304-12ACD) can be ordered through the ACDelco e-Store at acdelcoestore.com.

Electronic copies of the catalog (VC-CA-0304-12E) and oil supplement (10-SU-0305-12E) also can be downloaded from the ACDelco e-Store.

– Thanks to Don Vogrin

TechTips

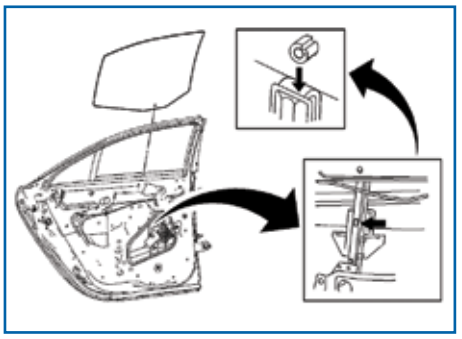
The following technical tips provide repair information about specific conditions on a variety of vehicles. If you have a tough or unusual service repair, the ***Diagnostic Hotline*** *can help. Call* ***1-800-825-5886, prompt #2****, from 8 a.m. to 8 p.m. ET Monday–Friday, to speak with a technical expert with the latest OEM information.*

Installing the Rear Window to the Window Regulator Assembly

After removal of a rear door window or rear window regulator on 2008-2012 Malibu, 2008-2009 G6 and 2007-2009 AURA models, the retaining pins may be difficult to reassemble in the door.

Follow these steps to reinstall the window glass to the regulator:

1. Remove the window from the door.
2. Position the window glass retaining pin in the window hole. Make sure the pin is centered in the opening.
3. Press the expansion pin back into the retaining pin. This will lock the pin into position in the window.
4. Reinstall window into the door.
5. Push the window and pin down into the groove of the window regulator. A loud audible snap should be heard, which confirms the window assembly is properly seated in the window regulator assembly.



No Crank, Transmission Shifts Hard

2013 Cadillac ATS; 2008-2013 Cadillac CTS; 2007-2009 Cadillac SRX; 2006-2011 Cadillac STS; equipped with a 6-Speed Automatic Transmission

One or more of the following conditions may be present:

- Service Engine Soon light on
- Reduced power
- The vehicle will not crank over, no start
- Multiple warning MILs illuminated
- Transmission shifts hard
- Door locks cycle while driving

The diagnostic system check may reveal that one or more DTCs are stored. The TCM or ECM may not communicate with the scan tool. The cause may be unseated pins in the transmission connector.

Inspect the transmission connector X1 terminal connections. Disconnect the connector and carefully tug on each wire to ensure the pins are fully seated. A side load on the wires may cause a false positive lock. Repair the connections as necessary.

Cold Engine Tick Noise

2009-2013 Cadillac Escalade models; 2009-2013 Chevrolet Express, Silverado, Suburban; 2009-2013 GMC Savana, Sierra; equipped with a 6.0L or 6.2L V8 engine (RPO L76, L96, LY6, L94, L9H)

A cold engine tick noise may be heard on these vehicles. The noise will diminish within 50 seconds of a cold start. The noise shuts off like a switch was flipped.

This condition may be a vehicle design characteristic as the ECM calibration is designed to meet cold start emissions. The noise that is heard is actually combustion taking place in the exhaust manifold. When the timer hits the 50 seconds it advances the timing and the noise is immediately gone.

Be sure to determine if the tick noise is possibly coming from the exhaust manifold, as the noise could easily be mistaken for an engine tick noise.

Programming the Vehicle Theft Deterrent

2006-2013 Chevrolet Impala; 2006-2007 Chevrolet Monte Carlo

If the Theft Deterrent Module (TDM) and ECM are replaced at the same time or, if during service, the theft deterrent becomes unsynchronized, the theft deterrent must be synchronized in order for the vehicle to start.

Depending on the state of the theft deterrent, the vehicle may have a no crank, no start condition, or a crank, start and stall condition.

If the ECM and TDM are replaced at the same time, reinstall the original ECM or the original TDM, if possible. Communication must be established with the original ECM or TDM. Next, service program the original module (ECM or TDM) and perform a 10 minute Vehicle Theft Deterrent learn.

If it is still necessary to replace the ECM or TDM, replace it. At this time, the ECM or TDM and key are synchronized. Service program the new ECM or TDM and perform a 10 minute Vehicle Theft Deterrent learn.

If neither the original ECM nor TDM is available or will not communicate, it will be necessary to also replace the ignition keys. If you attempt to program the new ECM or TDM using the original ignition keys and the vehicle will not start, check the Manufactures Enable Counter in the TDM ID information. If the Manufactures Enable Counter display is blank, the TDM has been programmed. If the counter reads a value other than zero, the TDM needs to be programmed.

Product Information

For free technical assistance and product information regarding specific ACDelco products, contact these toll-free information hotlines staffed by ASE-certified technicians:

Brakes – 1-888-701-6169 (prompt #1)
Chassis – 1-888-701-6169 (prompt #2)
Clutches – 1-888-725-8625
Lift Supports – 1-800-790-5438
Shocks – 1-877-466-7752
Starters and Alternators – 1-800-228-9672
Steering (Pumps, Rack and Pinion, Gears) – 1-866-833-5567
Wiper Blades – 1-800-810-7096

TrainingUpdate

2013 Training Course Catalog Available

The 2013 ACDelco Training Course Catalog is now available.

The catalog provides course descriptions for ACDelco Web-Based Training (WBT) courses, Instructor-Led Training (ILT) courses and Seminars (SEM) along with related training in Self-Study Training (SST), Tech-Assist (TAS), and Virtual Classroom Training (VCT) formats.

Technical course categories include:

A0: Fundamentals/Emerging Technologies

A1: Engine Repair

A2: Automatic Transmission/Transaxle

A3: Manual Drivetrain and Axles

A4: Suspension and Steering

A5: Brakes

A6: Electrical/Electronic Systems

A7: Heating and Air Conditioning

A8: Engine Performance

Business training includes:

- Service Consultant Skills
- Customer Satisfaction Process
- Financial Management
- Marketing

Download the 2013 ACDelco Training Course Catalog by visiting www.acdelcotechconnect.com and clicking the Training tab or logging in to the ACDelco Learning Management System (LMS).

New Courses

The latest ACDelco training courses cover many different topics ranging from HVAC systems to bi-fuel systems and electrical systems. Some of the new course releases include:

Course Number	Course Name
S-AC07-08.02WBT	HVAC Systems and Operation Stage 1
S-AC07-09.02WBT	HVAC Systems and Operation Stage 2
S-DS11-11.01SEM	Beyond the Four Strokes: What do you do when nothing you see is wrong but something is broken?
S-EL06-52.02WBT	GM Global Electrical Systems

Course Number	Course Name
S-EP08-08.02ILT	Evaporative Emissions Controls: Why is there always a code but never a leak we can find?
S-EP08-09.01ILT	Spark Generation: Is a lack of spark sending you up in flames?
S-EP08-29.01WBT	Bi-Fuel System Operation
S-FN00-07.01WBT	GM Safety Systems 3

How to Take ACDelco Training

Go to **www.acdelcotechconnect.com** and click the **Training tab** to log in to the ACDelco Learning Management System (LMS).

- To enroll in **courses in your training path** , open the home page to view your Training Progress Status Report, select Click Here to Show Detail, and then click the course number and title to view details on a specific course and to launch or enroll in the course.
- To enroll in an **Instructor-Led Training (ILT)** course (ILTs are full-day hands-on classroom courses), click Take Training > Instructor-Led Training to view the catalog and select a specific course.
- To enroll in a **Virtual Classroom Training (VCT**) course (VCTs are 1-2 hour live online courses), click Take Training > Virtual Classroom Training to view the catalog and select a specific course.
- To launch a **Web-Based Training (WBT)** course (WBTs are 1-4 hour self-guided online courses), click Take Training > Web-Based Training to view the catalog and select a specific course.
- To launch a **TechAssist (TAS)** course (TAS courses are 15-20 minute online presentations on a specific topic), click Take Training > TechAssist to view the catalog and select a specific course.
- To launch a **Simulation (SIM)** (SIMs require users to complete all repairs for a condition), click Take Training > Simulations to view the catalog and select a diagnostic challenge simulation.

Training Schedule

To search for currently scheduled courses in your area, view the Training in Your Area section on the Home page. Select search terms from the dropdown menus and click the Submit button.

Current Instructor-Led Training Courses

The following ILT courses are currently being scheduled:

Course Number	Course Name
S-AC07-02.01ILT	Automotive Air Conditioning Advanced Refrigerant System Diagnostics
S-AC07-03.01ILT	HVAC Control System Operation and Diagnostics
S-BK05-01.01ILT	Braking Systems
S-BK05-02.01ILT	ABS Operation and Diagnosis
S-DS11-13.01ILT	Vehicle Network Communications: When modules talk, who is really listening?
S-EL06-04.02ILT	Network Communication Diagnosis
S-EL06-10.02ILT	Electrical Power Management
S-EL06-11.02ILT	Enhanced Automotive Circuit Diagnosis
S-EL06-13.01ILT	Body Electrical Global Diagnostics
S-EL06-14.01ILT	Advanced Body Control System Electrical Diagnostics

Course Number	Course Name
S-EL06-16.01ILT	Hybrid Vehicle Service and Safety: Batteries Included
S-EP08-02.01ILT	Engine Performance Computer Controls and Ignition System Diagnostics
S-EP08-03.01ILT	Engine Performance Air Induction and Fuel System Diagnostics
S-EP08-04.01ILT	Engine Performance Fault Monitoring and Emission System Diagnostics
S-EP08-06.01ILT	After Combustion Sensors: Is what is in the exhaust making your engine run rough?
S-EP08-08.02ILT	Evaporative Emissions Controls: Why is there always a code but never a leak we can find?
S-EP08-09.01ILT	Spark Generation: Is a lack of spark sending you up in flames?
S-EP08-81.02ILT	Duramax Diesel Operation and Diagnosis
S-SS04-01.01ILT	Vibration Correction Diagnostics

The Technical Side (cont'd.)

Even though the 2014 Impala is a new vehicle, service and repair information resources are a click away at **www.gmtechinfo.com** – *Electronic Service Information.* Technicians and shop owners can log on to the site to gain access to subscription services for service procedures and repair manuals. A complete Service Manual is accessible 24/7 through a subscription to the site. Free collision repair procedures will soon be available for the vehicles by going to **www.genuinegmparts.com.**

Starter Replacement for the Ecotec 2.5L I-4 engine (LKW), 2014 Impala

Removal Procedure

1 Disconnect the battery negative cable. *Refer to Battery Negative Cable Disconnection and Connection.*

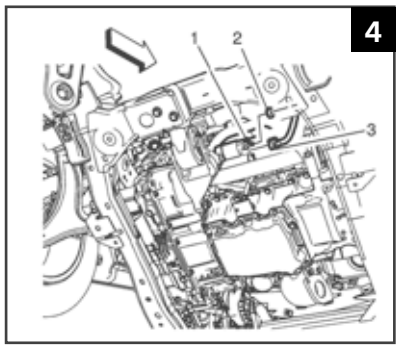
2 Remove the secondary air injection pump, if equipped. *Refer to Secondary Air Injection Pump Replacement.*

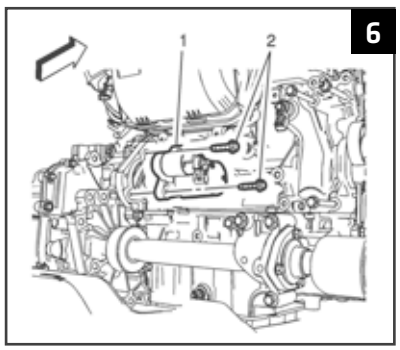
3 Raise and support the vehicle. *Refer to Lifting and Jacking the Vehicle.*

4 Disconnect the engine harness connector (3) from the starter solenoid.

5 Remove the battery positive cable fastener (2) and remove the battery positive cable terminal (1), from the starter solenoid.

6 Remove the starter mounting fasteners (2) and remove the starter (1).





Installation Procedure

Caution: *Refer to Starter Motor Alignment Caution.*

Caution: *Refer to Fastener Caution.*

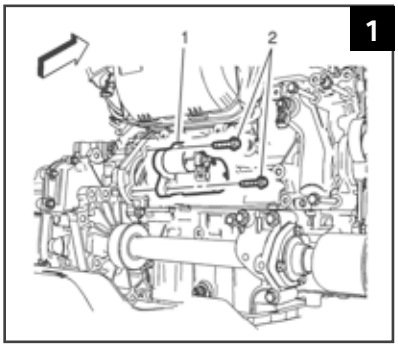
1 Install the starter (1) and torque the top fastener (2) to 22 Y (16 lb ft), then torque the bottom fastener (2) to 22 Y (16 lb ft).

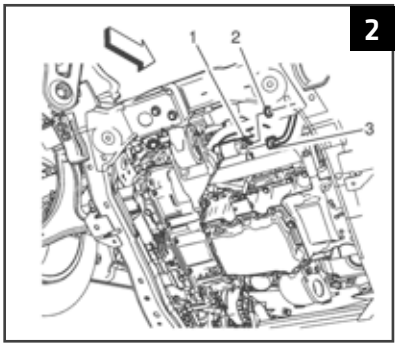
2 Install the battery positive cable terminal (1) to the starter solenoid and tighten the fastener (2) to 10 Y (89 lb in).

3 Install the engine wiring harness connector (3) to the starter solenoid.

4 Install the secondary air injection pump, if equipped. *Refer to Secondary Air Injection Pump Replacement.*

5 Connect the battery negative cable. *Refer to Battery Negative Cable Disconnection and Connection.*





WE'VE GOT ALL THE PARTS YOU NEED TO DO IT RIGHT, THE FIRST TIME!

If you're doing a powertrain repair procedure, remember that we've got all the parts you need – cylinder heads, actuator motors, electrical, pulleys and tensioners, gaskets – whatever you need to keep your customers happy . . . and coming back.

The Technical Side (cont'd.)

Generator Replacement for the Ecotec 2.5L I-4 engine (LKW) in the 2014 Impala

Removal Procedure

1 Disconnect the negative battery cable. *Refer to Battery Negative Cable Disconnection and Connection.*

2 Remove the air cleaner outlet duct. *Refer to Air Cleaner Outlet Duct Replacement.*

3 Remove the secondary air injection pump inlet hose, if equipped. *Refer to Secondary Air Injection Pump Inlet Hose Replacement.*

4 Remove the drive belt. *Refer to Drive Belt Replacement.*

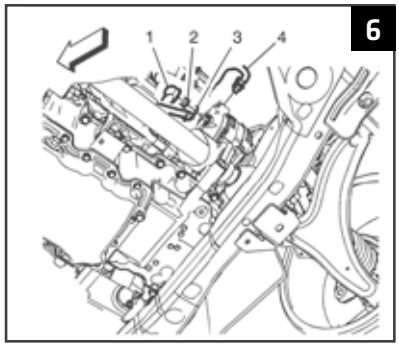
5 Raise and support the vehicle. *Refer to Lifting and Jacking the Vehicle.*

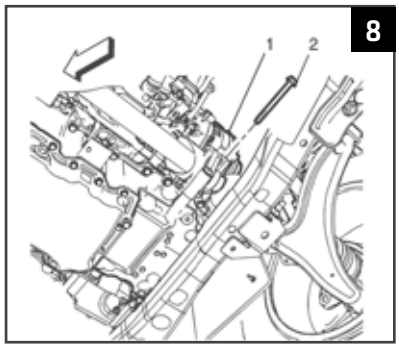
6 Remove the protective boot (1) and the battery positive cable fastener (2).

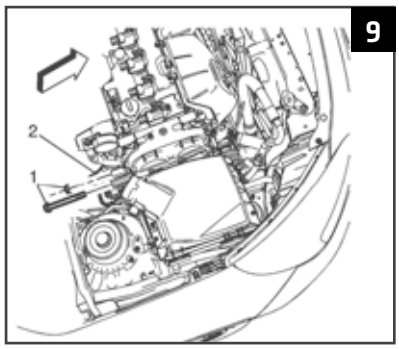
7 Remove the battery positive cable terminal (3) and the engine harness connector (4) .

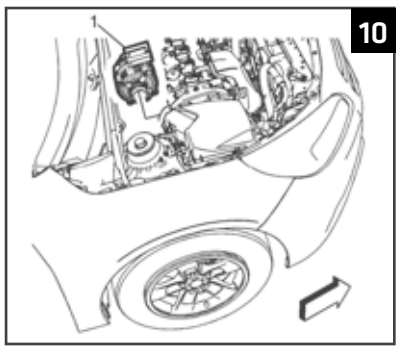
8 Remove the lower generator mounting fastener (2).

9 Remove the upper generator mounting fasteners (1) and secondary air injection pump inlet hose bracket, if equipped.









10 Remove the generator (1) from the engine compartment.

Installation Procedure

Caution: *Refer to Fastener Caution.*

Note: *Position the secondary air injection pump inlet hose bracket to the generator (LCV Engine), if equipped.*

1 Install the generator (2) into position and tighten the fasteners (1) to 22 Y (16 lb ft).

2 Install the generator lower mounting fastener (2) and tighten to 22 Y (16 lb ft).

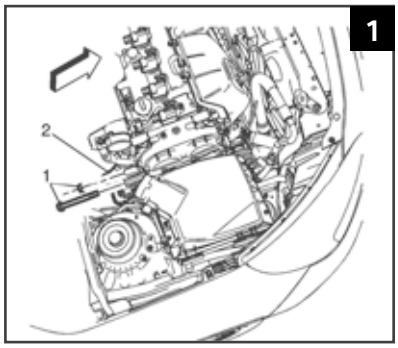
3 Install the air cleaner outlet duct. *Refer to Air Cleaner Outlet Duct Replacement.*

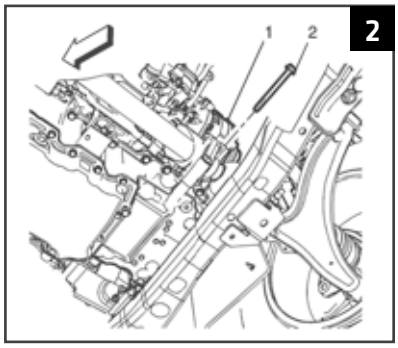
4 Install the battery positive cable (3) to the back of the generator and tighten the fastener (2) to 15 Y (11 lb ft).

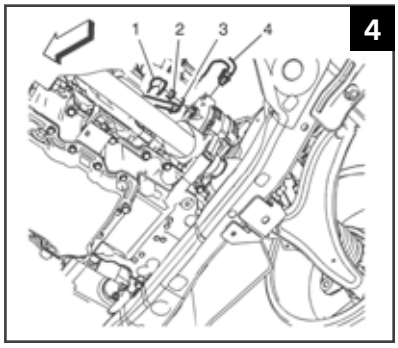
5 Install the protective boot (1) and connect the engine wiring harness connector (4).

6 Install the drive belt. *Refer to Drive Belt Replacement.*

7 Install the secondary air injection pump inlet hose, if equipped. *Refer to Secondary Air Injection Pump Inlet Hose Replacement.*







These examples of Starter and Generator Replacement for the Ecotec 2.5L I-4 engine (LKW) in the 2014 Impala are just two of many found in their Service Repair Manuals. By following the proper repair procedures, technicians can ensure that each vehicle maintains its solid performance and uncompromised safety features for the life of the vehicle.

Dynamic Duo Delivers

Chevrolet Performance Parts Helps Washington 'Vette Specialist Resurrect Classics

When a 1997 Corvette owner started feeling a little power- and status-starved with his well-worn stock LS1 engine, his instincts brought him to the right place. Two of them, actually: Corvettes of Auburn and Chevrolet Performance.

For folks in the Seattle area and beyond wanting to spruce up and juice up their Corvettes or other prized set of wheels, there are few destinations better primed to deliver than Corvettes of Auburn. Operating out of the Seattle suburb of Auburn for the last 20 years, Dan Tumia, owner, has built a reputation across the Pacific Northwest as a man to see for quality restorations and repowering.

Chevrolet Performance, a brand Tumia is well-versed in, was the owner's second great call. Staying in the GM family, he selected an LS3 376/480 Hot Cam engine as the successor to his LS1, which had faithfully logged some 130,000 miles.

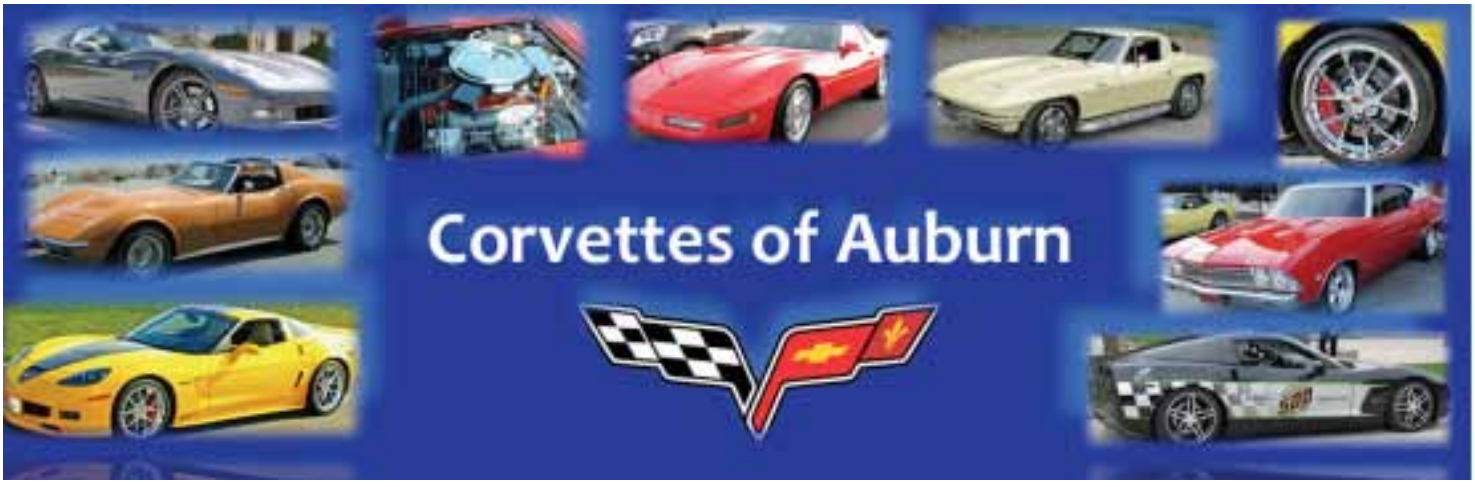
The combination of the powerful small-block V-8 engine, combined with Corvettes of Auburn's expertise in handling the trickiest repowering jobs, proved to be a winner. Today, that owner has the best of both worlds: a priceless C5 Corvette whose stock LS1 broke new ground when it was new, now fully up-to-date under the hood with today's state-of-the-art premium Corvette engine.

"He wanted more power and the drive train beefed up with new and improved parts," Tumia says. "The LS3 Hot Cam crate performance motor comes with everything from fuel injectors to the oil pan, but without some of the bolt-on hardware on the front like the serpentine belt and the alternator. For the most part, most everything from the original LS1 transferred easily over to the LS3."

One challenge was relocating the knock sensors. "On the new engine we had to position the existing boss that was used for the LS1 back to where it was," Tumia says.

Vacuum lines also had to be rerouted, a challenge, he says, because the conversion entailed going from a return to a non-return system. "It would recycle through the fuel pump and not back to the engine, so we had to modify the fuel return line to make that fit," he says.

Radiator hose configurations also posed a challenge. With the water pump inlets and outlets in different spots on the radiators in the LS1 and LS3, Tumia had to devise a customized fix that would work in the new engine configuration.



The Business of Repairs (cont'd.)

A customer's '97 'Vette gets an LS3 upgrade at Corvettes of Auburn, Auburn, Wash.

Tumia also had to contend with some pilot bearing issues. "When we went to put the torque tube into the pilot bearing we came up 1/16-inch short, so we used bolts to pull it up snug and flush, "he says. "We started the car up and ran it a bit before putting on the dyno and we heard a noise coming from the clutch. We pulled everything out, looked at the pilot bearing again and we were shaking our heads trying to figure out what we did wrong. Turns out that the torque tube input shaft was for the LS1, not the LS3 and so it was deeper into the crankshaft. We ended up beefing up the torque tube, and we used a solid coupling rather than a stock rubber one for a device that links the back of the engine to the clutch."

Dan Tumia, owner, Corvettes of Auburn, Auburn, Wash.

Tumia also encountered some issues with crankshaft positioning. The crank trigger, which with the help of the power control module, reads the crankshaft position, was different on the LS1. "The crankshaft position gear in the LS1 has different amount of teeth on it than the LS3, so using the LS1 PCM we needed a go-between that would divide out the number of teeth on the wheel so the LS3 computer could read it," he says.

Moving from a stock throttle body on the LS1 to a larger one for the LS3 presented another challenge. The on-board computer in the LS3, Tumia says, was detecting "way too much air, so we had to consider that when we remapped the PCM."

In the end, Tumia's customer got what he was seeking. Outfitted with new headers, a new clutch, a stiffened up 6-speed transmission, and an aftermarket interface to rectify the crank trigger issue, the Vette was dyno-tuned to deliver 428 horsepower and 421 lb.-ft. of torque at the wheels, yielding a final reading of approximately 496 horsepower and 488 lb.-ft. of torque. "It runs strong and has some real nice lope to it," he says.

A 35-hour job, the project was typical of the ones Tumia has learned to do almost in his sleep over the years. Some of that credit goes to Chevrolet Performance products. Those products, he says, are just what many of his customers are looking for: engines easily installed but able to deliver the punch they want to extend the lives of their prized vehicles.

"We get a lot of customers coming in with cars that may not be worth much – older C4s and C3s – but that are driven hard, and they're looking to bring back the luster of days gone by." Tumia, of course, is happy to oblige.

LS3 Crate Engine in the shop, Corvettes of Auburn, Auburn, Wash.

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